 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: DCA05MA003		Aircraft Registration Number: N8396A	
		Occurrence Date: 10/14/2004		Most Critical Injury: Fatal	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Jefferson City	State MO	Zip Code	Local Time 0000	Time Zone EDT	
Airport Proximity:		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Canadair		Model/Series CL-600		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
<p>Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:</p> <p>The Safety Board's full report is available at http://www.nts.gov/publicn/publicn.htm. The Aircraft Accident Report number is NTSB/AAR-07/01.</p> <p>On October 14, 2004, about 2215:06 central daylight time, Pinnacle Airlines flight 3701 (doing business as Northwest AirlinK), a Bombardier CL-600-2B19, N8396A, crashed into a residential area about 2.5 miles south of Jefferson City Memorial Airport (JEF), Jefferson City, Missouri. The airplane was on a repositioning flight from Little Rock National Airport (LIT), Little Rock, Arkansas, to Minneapolis-St. Paul International Airport (MSP), Minneapolis, Minnesota. During the flight, both engines flamed out after a pilot-induced aerodynamic stall and were unable to be restarted. The captain and the first officer were killed, and the airplane was destroyed. No one on the ground was injured. The flight was operating under the provisions of 14 Code of Federal Regulations (CFR) Part 91 on an instrument flight rules flight plan. Visual meteorological conditions prevailed at the time of the accident.</p> <p>Flight 3701 departed LIT about 2121. The flight plan indicated that the company-planned cruise altitude was 33,000 feet. About 5 seconds after takeoff, when the airplane was at an altitude of about 450 feet mean sea level (msl) (about 190 feet above ground level), the first of three separate pitch-up maneuvers during the ascent occurred when the flight crew moved the control column to 8 airplane nose up (ANU), causing the airplane's pitch angle to increase to 22 and resulting in a vertical load of 1.8 Gs. The rate of climb during this pitch-up maneuver was 3,000 feet per minute (fpm). Immediately afterward, the flight data recorder (FDR) recorded stick shaker and stick pusher activations, a full airplane-nose-down (AND) control column deflection, a decrease in pitch angle, and a drop in vertical load to 0.6 G.</p> <p>About 2125:55, when the airplane was at an altitude of about 14,000 feet, the flight crew engaged the autopilot. The air traffic control (ATC) transcript and FDR data showed that the flight crewmembers changed seats in the cockpit during this time, but the ATC transcript did not indicate the reason for the seat change. About 2127:15, when the airplane was at an altitude of about 15,000 feet, the flight crew disengaged the autopilot.</p> <p>About 2127:17, when the airplane was in level flight at an altitude of 15,000 feet, the second pitch-up maneuver began when the flight crew moved the control column to 3.8 ANU, causing the airplane's pitch angle to increase to 17 and resulting in a vertical load of 2.3 Gs. The rate of climb during this pitch-up maneuver reached 10,000 fpm briefly. Between about 2128:40 and about 2128:43, the flight crew made a left rudder input of 4.2, a right rudder input of 6.0, and a left rudder input of 0.4, resulting in lateral loads of -0.16 G, 0.34 G, and -0.18 G, respectively. About 17 seconds later, the flight crew made a right rudder input of 7.7. About 2132:40, when the airplane was in level flight at an altitude of 24,600 feet, the third pitch-up maneuver began when the flight crew moved the control column to 4 ANU, which increased the airplane's pitch angle to more than 10 and resulted in a vertical load of 1.87 Gs. The rate of climb during this pitch-up</p>					
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maneuver reached 9,000 fpm briefly.

The ATC transcript showed that the captain requested a climb to 41,000 feet, which is the Canadair regional jet (CRJ) maximum operating altitude, about 2135:36 and received clearance to climb to that altitude about 2136:13. The cockpit voice recorder (CVR) recording began about 2144:44 with the captain and the first officer discussing the climb to 41,000 feet. About 2148:44, the first officer stated, "man we can do it. Forty one it." About 2151:51, the first officer stated, "there's four one oh my man." About 2152:04, the CVR recorded the first officer laughing as he stated, "this is great." FDR data showed that, about 2152:08, the airplane was in level flight at 41,000 feet. FDR data also showed that the airplane climbed from 37,000 to 41,000 feet at an airspeed that decreased from 203 knots/0.63 Mach at the start of the climb to 163 knots/0.57 Mach as the airplane leveled off. The FDR data further showed that the autopilot vertical speed mode was engaged during the climb with a commanded vertical speed of 500 fpm and that the airplane's angle of attack (AOA) at 41,000 feet was initially 5.7.

About 2152:22, the CVR recorded the captain asking the first officer whether he wanted something to drink and then the first officer responding that he wanted a soda. CVR evidence indicated that the captain left his seat shortly afterward to get the drink.

About 2153:28, the CVR recorded the captain stating, "look how high we are." About 2153:42, a controller at the Kansas City Air Route Traffic Control Center (ARTCC) asked the pilots whether they were flying a CRJ-200. The captain confirmed this information, and the controller stated, "I've never seen you guys up at forty one there." About 2153:51, the captain replied, "we don't have any passengers on board so we decided to have a little fun and come on up here." About 2153:59, the captain added, "this is actually our service ceiling."

About 2154:07, the captain told the first officer, "we're losing here. We're gonna be coming down in a second here." About 3 seconds later, the captain stated, "this thing ain't gonna hold altitude. Is it?" The first officer responded, "it can't man. We (cruised/greased) up here but it won't stay." About 2154:19, the captain stated, "yeah that's funny we got up here it won't stay up here." About 2154:32, the captain contacted the controller and stated, "it looks like we're not even going to be able to stay up here look for maybe three nine oh or three seven." About 2154:36, the FDR recorded the activation of the stick shaker. FDR data showed that, at that point, the airplane's airspeed had decreased to 150 knots, and its AOA was about 7.5.

The FDR recorded activations of the stick shaker and the stick pusher three times between 2154:45 and 2154:54. FDR data showed that, after the second activation of the stick shaker and stick pusher, the No. 1 (left) and No. 2 (right) engines' N1 (fan speed) and fuel flow indications began decreasing. FDR data also showed that, at the time of the second stick pusher activation, the airplane's AOA had increased to 12 and that, after the stick pusher activated for the third time, the pitch angle decreased from 7 to -20.

About 2154:57, the FDR recorded the fifth activation of the stick shaker and the fourth activation of the stick pusher. Even with the stick pusher's activation, the motion of the airplane continued to increase its AOA to the maximum measurable value of 27. The pitch angle increased to 29, and the airplane entered an aerodynamic stall. Afterward, a left rolling motion began, which eventually reached 82 left wing down, the airplane's pitch angle decreased to -32, and both engines flamed out. About 2155:06, the captain stated to the controller, "declaring emergency. Stand by." FDR data showed that, during the next 14 seconds, the flight crew made several control column, control wheel, and rudder inputs and recovered the airplane from the upset at an altitude of 34,000 feet. During the recovery, the CVR recorded a sound similar to decreasing engine rpm, and FDR data showed that the No. 1 and No. 2 engines' N1 indications continued to decrease and that the engines' fuel flow indications were at zero.

About 2155:14, the controller told the pilots to descend and maintain an altitude of 24,000 feet; about 5 seconds later, the captain acknowledged the assigned altitude. About 2155:20, the FDR stopped recording because normal a.c. power to the airplane was lost. (The CVR had a different

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source of power and continued to record.) The last reliable N2 (core speed) recorded by the FDR before it stopped operating was 46 percent for the No. 1 engine and 51 percent for the No. 2 engine. About 2155:23, one pilot stated to the other, "we don't have any engines," and, about 10 seconds later, the captain stated, "double engine failure." About 2156:42, the flight crew began performing the double engine failure checklist, which required pilots to maintain 240 knots until they were ready to initiate the double engine failure procedure. The checklist indicated that, if the airplane were at or below 21,000 feet and above 13,000 feet, pilots should relight the engines using the windmill restart procedure, which required an airspeed of at least 300 knots. The procedure indicated that an altitude loss of 5,000 feet could be expected when accelerating from 240 to 300 knots.

The FDR resumed operation about 2159:16. FDR data showed that the auxiliary power unit (APU) was supplying electrical power to the airplane, both engines' N1 indications continued to decrease, and both engines' N2 indications were at zero. FDR data also showed that the airplane's altitude was 29,200 feet and that its airspeed was 178 knots.

About 2200:38, the captain told the first officer to increase the airspeed to above 300 knots, and the first officer acknowledged this instruction. FDR data showed that the airplane pitched down to -4.4 and accelerated to an airspeed of 200 knots but that, during the next 25 seconds, the airplane pitched up to 0 while its airspeed remained at 200 knots. About 1 minute later, the captain again told the first officer to increase the airspeed to 300 knots. FDR data showed that the airplane pitched down to -7.5 and accelerated to an airspeed of 236 knots (the maximum airspeed achieved during the windmill restart attempt) but that, during the next 22 seconds, the airspeed decreased to 200 knots.

About 2201:51, the captain stated, "we're not getting any N two at all. So we're gonna have to go to thirteen thousand feet. We're going to use the APU bleed air [restart] procedure." Shortly afterward, the captain resumed the double engine failure checklist, which indicated that pilots were to maintain between 170 and 190 knots until they were ready to initiate the APU bleed air restart procedure.

About 2203:09, the controller asked the flight crew about the nature of the emergency. The captain responded, "we had an engine failure up there so we're gonna descend down now to start our other engine." About 2203:30, the captain stated, "we're descending down to thirteen thousand to start this other engine," and the controller replied, "understand controlled flight on a single engine right now." FDR data showed that, during the next several minutes, four APU-assisted engine restarts were attempted, but the N2 speed for both engines remained at zero throughout the restarts. About 2206:40, the controller asked the flight crewmembers whether they wanted to land; the captain replied, "just stand by right now we're gonna start this other engine and see if everything's okay." About 2206:54, the controller informed the flight crew that JEF was up ahead, and the captain acknowledged this information.

About 2208:17, the CVR recorded the captain stating, "switch." About 2209:02, the captain instructed the first officer to tell the controller that they needed "to get direct to [an] airport neither engine's started right now." The first officer informed the controller for the first time of the double engine failure, and the controller then asked the pilots if they wanted to go direct to JEF. The captain stated, "any airport and closest airport," and the first officer told the controller, "closest airport. We're descending fifteen hundred feet per minute we have nine thousand five hundred feet left."

Between about 2210:21 and about 2211:20, the controller provided information about the winds, the approach frequency, and the localizer frequency for an instrument landing system (ILS) landing to runway 30 at JEF. About 2212:24, the first officer asked the controller where to look for the airport, and the controller provided position, distance, and heading information. About 1 minute later, the controller provided additional location information for JEF. About 2213:37, the captain asked the first officer whether the airplane was aligned with the runway, and the first officer

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notified the controller that he did not see the runway. The controller provided further directional information, and the first officer told the controller that he thought he had the approach end of the runway in sight. The controller received no further transmissions from the flight crew.


About 2214:02, the first officer told the captain that he had the runway in sight. The captain questioned the first officer about the location of the runway and then stated, about 2214:17, "we're not gonna make this." About 2214:38, the captain stated, "is there a road? We're not gonna make this runway." Radar data showed that the airplane then turned left and headed toward a straight and lit section of highway. About 2214:46, the captain stated, "let's keep the gear up I don't want to go into houses here." About 2214:53, the final radar return was received when the airplane was about 0.58 nautical mile southeast of the crash site and at an altitude of 930 feet.

About 2214:54, 2214:58, and 2215:00, the CVR recorded the enhanced ground proximity warning system (GPWS) alerts "too low gear," "too low terrain," and "pull up," respectively. About 2215:03, the CVR recorded the captain stating, "we're gonna hit houses," and, about 2 seconds later, the enhanced GPWS alert "pull up." About 2215:06, the CVR recorded a sound similar to an impact and stopped recording about 1 second afterward.

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Landing Facility/Approach Information						
Airport Name		Airport ID:	Airport Elevation Ft. MSL	Runway Used	Runway Length	Runway Width
Runway Surface Type:						
Runway Surface Condition:						
Type Instrument Approach:						
VFR Approach/Landing:						
Aircraft Information						
Aircraft Manufacturer Canadair		Model/Series CL-600		Serial Number		
Airworthiness Certificate(s):						
Landing Gear Type: Retractable - Tricycle						
Homebuilt Aircraft? No	Number of Seats:	Certified Max Gross Wt. LBS		Number of Engines:		
Engine Type:	Engine Manufacturer:	Model/Series:		Rated Power:		
- Aircraft Inspection Information						
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection Hours		Airframe Total Time Hours		
- Emergency Locator Transmitter (ELT) Information						
ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?				
Owner/Operator Information						
Registered Aircraft Owner		Street Address				
		City	State	Zip Code		
Operator of Aircraft PINNACLE AIR INC		Street Address				
		City	State	Zip Code		
Operator Does Business As:			Operator Designator Code: P8JA			
- Type of U.S. Certificate(s) Held:						
Air Carrier Operating Certificate(s): Flag Carrier/Domestic						
Operating Certificate:			Operator Certificate:			
Regulation Flight Conducted Under: Part 91: General Aviation						
Type of Flight Operation Conducted: Positioning						
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First Pilot Information										
Name			City		State					
Sex:	Seat Occupied:	Principal Profession:		Certificate Number:						
Certificate(s):										
Airplane Rating(s):										
Rotorcraft/Glider/LTA:										
Instrument Rating(s):										
Instructor Rating(s):										
Type Rating/Endorsement for Accident/Incident Aircraft?										
Current Biennial Flight Review?										
Medical Cert.:		Medical Cert. Status:		Date of Last Medical Exam:						
- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time										
Pilot In Command(PIC)										
Instructor										
Last 90 Days										
Last 30 Days										
Last 24 Hours										
Seatbelt Used?		Shoulder Harness Used?			Toxicology Performed?		Second Pilot? Yes			
Flight Plan/Itinerary										
Type of Flight Plan Filed: IFR										
Departure Point		State				Airport Identifier		Departure Time		Time Zone
Little Rock		AK				LIT		2220		CDT
Destination		State				Airport Identifier				
Minneapolis		MN				MSP				
Type of Clearance: IFR										
Type of Airspace:										
Weather Information										
Source of Briefing: Company										
Method of Briefing:										

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Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation Ft. MSL	WOF Distance From Accident Site NM	Direction From Accident Site Deg. Mag.
Sky/Lowest Cloud Condition:			Ft. AGL		Condition of Light:
Lowest Ceiling:			Ft. AGL		Visibility: SM
Temperature: °C		Dew Point: °C	Wind Direction:		Altimeter: "Hg
Wind Speed:		Gusts:	Weather Conditions at Accident Site:		
Visibility (RVR): Ft.		Visibility (RVV) SM	Intensity of Precipitation:		
Restrictions to Visibility:					
Type of Precipitation:					
Accident Information					
Aircraft Damage: Destroyed		Aircraft Fire: Ground		Aircraft Explosion: None	
Classification: U.S. Registered/U.S. Soil					
- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot	1				1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -	2				2
Other Ground					
- GRAND TOTAL -	2				2

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Administrative Information		
Investigator-In-Charge (IIC) Lorenda Ward		
Additional Persons Participating in This Accident/Incident Investigation:		
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